Components, Goals & Functions of Operating system

Goals -> These define the purpose of an OS—what it aims to achieve
Functions -> These describe the tasks performed by the OS to meet its goals.
Components -> These are the building blocks that enable the OS to perform its functions.

For eg : Think of an OS like a restaurant

- **Goals** → Serve quality food
- **Functions** → Cooking, taking orders, serving food
- **Components** → Kitchen, waiters, menu, tables

Components of Operating system

The operating system is a complex software made up of various components that work together to manage system resources, ensure security, and provide an interface for users and applications. Each component has a specialized role, but all are critical for the overall functioning of the OS and the stability of the system.

- **Kernel** – The core of the OS that manages system resources.
- **Process Management Module** – Handles process creation, scheduling, and execution.
- **Memory Management Module** – Manages RAM allocation and virtual memory.
- **File System** – Organizes and manages data storage.
- **Device Drivers** – Allows communication between the OS and hardware.
- **User Interface (CLI/GUI)** – Enables user interaction with the system.

Goals of Operating system

These define the purpose of the OS

- **Efficiency** – Ensure optimal use of system resources (CPU, memory, storage, etc.).
- **User Convenience** – Provide a user-friendly interface (CLI/GUI) for interaction.
- **Security & Protection** – Safeguard system data and processes from unauthorized access.
- **Multitasking & Parallel Processing** – Support multiple processes and users efficiently.
- **Reliability & Fault Tolerance** – Ensure system stability, error handling, and recovery.

Primary functions of an OS

- **Process Management** –> Operating system manages the creation, scheduling, and termination of processes on the computer. It allocates CPU memory to different processes to run simultaneously, allocating CPU time among them.

- **Memory Management** –> Operating system allocates memory to processes when needed and frees it when no longer required. It implements virtual memory, allowing the use of secondary storage as an extension of RAM for larger applications.

- **File System Management**–> Operating system manages files on disk, organizing them into folders and directories for easy access and storage. It handles file creation, deletion, and modification. It also helps in managing file access permissions and security.

Primary functions of an OS

- **Device Management**-> Operating system manages input/output devices (printers, keyboards, disks, etc.) and provides a layer of abstraction, allowing applications to interact with hardware through drivers.

- **Security and Access Control**-> Operating system enforces user authentication, permissions, and protects against unauthorized access. It provides security features like firewalls and antivirus software.

- **Networking**-> Operating system manages network connections and data sharing. It facilitates network communications, allowing devices to connect, share data, and access resources over local or remote networks.

- **User Interface**-> Operating sytem provides an interface for users to interact with the system, typically through a command-line interface (CLI) or a graphical user interface (GUI). It also allows users to execute commands, manage files, and interact with applications in a user-friendly way.